

**ATTACHMENT J-22**  
**ENHANCED CUTTER PERFORMANCE SPECIFICATION TEMPLATE**  
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## ATTACHMENT J-22

### ENHANCED CUTTER PERFORMANCE SPECIFICATION TEMPLATE

#### 1 INTRODUCTION

This template provides minimum requirements for the development of an enhanced “total ship” performance specification for cutters, both new construction and conversion/major upgrades of legacy vessels. It shall not be used for minor upgrades, limited alterations, or repairs that only affect systems, subsystems, or major components of the cutter. It is generic in nature. It is expected that this template will require some tailoring to reflect the requirements of each unique asset. Sections that do not apply to a specific cutter type need not be addressed and sections should be added as appropriate to properly specify the performance of a specific cutter type, which have not been anticipated by this baseline template. For legacy cutters being converted/upgraded, if the feature/capability applies but is not being changed/impacted, the words “No change intended” shall be inserted.

**The Enhanced Performance Specification should comply with the System Performance Specification to fulfill allocated functional requirements in the context of the Concept of Operations.** The total “ship performance specification” should document the total cutter performance and verification requirements and should include additional descriptions of the salient, essential, innovative, and/or particularly attractive attributes of the cutter and that validate the specified performance and capabilities. These “key features” represent the enhancement to the performance specification.

Texts in *italics* provide descriptions for each template section. Normal text contains specific requirements and topic headings.

The performance specification should follow the guidelines of MIL-STD-961D. The performance specification should not describe “tasks or requirements for technical documentation” for the contractor or subcontractors.

#### 2 SCOPE

This section addresses the scope of a ship performance specification which: describes in brief the total ship in terms of required/desired performance, provides requirements for verification of performance, describes all ship interface requirements, describes the environment in which the ship must operate, and states asset performance requirements, at the highest possible level.

##### ***2.1 IDENTIFICATION/DESCRIPTION***

#### 3 APPLICABLE DOCUMENTS

This section should include a listing of all documents referenced in Sections 3 and 4 of this performance specification. The section should also specifically reference the Cutter Specific Certification Matrix (CSCM).

## 4 REQUIREMENTS

- *This section provides a description of the operational capabilities, operating requirements and asset level (functional) performance requirements.*
- *Any of the key features, as indicated in the introduction above, should be added and described in each section where applicable.*
- *Requirements herein that are also in the CSCM should be so noted where they occur. Alternatively, the specification may cite the CSCM (e.g., “See the Cutter Specific Certification Matrix”) if the specific relevant standard is not included or if the CSCM provides additional requirements.*

### 4.1 SHIP MISSION REQUIREMENTS

#### 4.1.1 PLAN FOR USE

This section addresses the required ship capabilities depicted in the profiles listed below. These profiles should include textual and graphical/pictorial methods as needed to describe the specific missions of the ship.

##### 4.1.1.1 Deployment or Utilization Profile

This section addresses the ship’s overall operational profile. It should include a ship schedule sufficient to fully describe the operations of the ship.

Table I represents planned ship utilization. It is tailored around a \_\_\_\_ year operational and modernization cycle. The overhaul cycle of the ship shall be greater than \_\_\_\_ months and the overhaul duration shall not exceed \_\_\_\_ months. The dry-docking cycle of the ship shall be greater than \_\_\_\_ months.

TABLE I. X-Year operating profile

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12
Year 1												
Year 2												
Year 3												
•												
•												
•												
Year X												

## LEGEND:

SQT                      Ship Qualification Tests

REFTRA                Refresher Training

ENR                    Enroute

DEP                    Deployment

RO                     Regular Overhaul

MOD                   Modernization

AVAIL                  Availability

*4.1.1.2 Operational Profiles*

This section addresses the ship's operational profiles (average day in the Coast Guard, mean high water and surge operational profiles as defined in the IDS Modeling and Simulation Master Plan (MSMP)). It should include descriptions of the mission scenarios and depiction of operating conditions & missions, readiness, utilization and speed-time distribution.

Table II represents the time that the ship will be in various ship states during operations. The ship is expected to be underway \_\_\_\_ hours in an average year. The percentage of time it is expected to operate at various speeds, as shown in Figure 1.

TABLE II. Percent time in various ship states

Ship States	Percent of Time	Remarks
Operations		
Deployed (less transit time)	—	
Underway	—	
In Port		
Non-Deployed	—	
Underway	—	
In Port		
Utilization up to First Overhaul		
At Sea	—	
In Port	—	
Operational Readiness Conditions		
I	—	
II	—	
III	—	
—		

Percent Time Underway	
Speed (Knots)	

FIGURE 1. Speed time distribution.

#### 4.1.2 MISSION PROFILE

This section addresses all of the ship's mission capabilities. It should include descriptions of the mission capabilities of the ship. See Section I of the System Performance Specification (SPS) for the Integrated Deepwater System.

- 4.1.2.1 *Alien Migration Interdiction Operations (AMIO)*
- 4.1.2.2 *Deployed Port Operations, Security and Defense (DPOSD)*
- 4.1.2.3 *Drug Interdiction*
- 4.1.2.4 *Environmental Defense*
- 4.1.2.5 *Foreign Vessel Inspection*
- 4.1.2.6 *General Defense Operations (GDO)*
- 4.1.2.7 *General Law Enforcement*
- 4.1.2.8 *International Ice Patrol (IIP)*
- 4.1.2.9 *Lightering Zone Enforcement*
- 4.1.2.10 *Living Marine Resource Enforcement (LMR)*
- 4.1.2.11 *Maritime Interception Operations (MIO)*
- 4.1.2.12 *Maritime Pollution (MARPOL) Enforcement*
- 4.1.2.13 *Search and Rescue (SAR)*
- 4.1.2.14 *Peacetime Military Engagement (PME)*

#### 4.2 OPERATIONAL ENVIRONMENT

This section presents a description of the environment the ship will be required to operate in or be exposed to, and the level of performance the ship will be required to meet within these environments.

#### 4.2.1 THREAT ENVIRONMENT

This section presents a description of the types and nature of threats the ship will experience or be exposed to, and may include space, air, surface and subsurface threats, and simultaneous threat environments.

#### 4.2.2 NATURAL ENVIRONMENT

This section presents a description of the natural environment in which the ship is required to operate and the operational capability levels required (e.g. full capability, reduced capability, or survive).

##### 4.2.2.1 *Weather Environment*

The ship systems and equipment that are exposed to or affected by the weather environment shall provide the required capability in the environment shown in Table III. It shall be assumed that any reasonable combination of these conditions can occur simultaneously.

TABLE III. Systems capability at specific weather conditions

System/Equipment	Capability	Air Temp. (min/max) (deg F)	Sea Temp. (min/max) (deg F)	Relative Humidity (min/max)	Wind (knots)	Precipitation
Mission Essential Systems	Full Capability					Heavy Rain, Snow, Hail, Freezing Rain
Machinery in Exposed Locations	Full Capability					Rain, Snow, Freezing Rain
All Electronics Systems	Full Capability					Heavy Rain, Snow, Hail, Freezing Rain
Main Machinery Plant	Full Capability					Heavy Rain, Snow, Hail, Freezing Rain
All Other Ship Systems	Full Capability					Rain, Snow, Freezing Rain

##### 4.2.2.2 *Sea Conditions*

Specific performance requirements applicable to the range of sea conditions in which the ship is to operate shall be in accordance with Table IV.



TABLE IV. Sea conditions

Performance Requirements	Environmental Conditions
CONREP and Strikedown Underway	
VERTREP and Strikedown Underway	
Launch/Retrieval of Cutter Boats	
Launch/Retrieval of Aircraft	
Continuous Efficient Operations (other than replenishment and strikedown and launch/retrieval of boats/aircraft)	
Limited Operation and Capability of Continuing Mission without Returning to Port for Repairs after Sea Subsides	
Survive without Serious Damage to Mission-Essential Systems	

Notes:

The sea states referred to above are those defined by the Bretschneider formulation. Seakeeping performance shall be determined using the sea distribution shown in Table V.

TABLE V. Sea Distribution

Sea State	Significant Wave Height (ft)	Modal Wave Periods (sec)	Probability Density

0-1	0.0 – 0.3	0	0
2	0.3 – 1.6	3.0 – 15.0	4.1
3	1.6 – 4.1	5.2 – 15.5	16.9
4	4.1 – 8.2	5.9 – 15.5	27.8
5	8.2 – 13.1	7.2 – 16.5	23.5
6	13.1 – 19.7	9.3 – 16.5	16.3
7	19.7 – 29.5	10.0 – 17.2	9.1
8	29.5 – 45.5	13.0 – 18.4	2.2
greater than 8	Greater than 45.5	20.0	0.1

#### 4.2.3 ELECTROMAGNETIC ENVIRONMENT

This section addresses the ship's requirement to operate with electromagnetic compatibility (EMC) and avoid hazards related to electromagnetic radiation to personnel (HERP) and fuels (HERF) and to provide protection for Hazards of Electromagnetic Radiation to Ordnance (HERO). This section also addresses the cutter's requirement to operate following electromagnetic pulse exposure (if applicable).

TABLE VI. Near field EM levels

Frequency Range (MHz)	Power Density Peak (mw/cm <sup>2</sup> )	Power Density Average (mw/cm <sup>2</sup> )	Field Strength Peak (V/m)	Field Strength Average (V/m)
Less than 30				

30-2000				
Greater than 2000				

#### 4.2.4 EXTERNAL AND FLEET INTERFACE/INTEROPERABILITY

This section provides a description of the physical external interfaces the ship is expected to have with shore facilities or with other platforms for mooring, and supply of shore services such as electrical power, potable water, and steam. The specific interfaces should be identified based on the mission requirements.

##### 4.2.4.1 *Shore Facilities Interface*

##### 4.2.4.2 *Towing*

This section includes capability/extent to tow or be towed and interfaces.

##### 4.2.4.3 *Stores Replenishment Interfaces*

##### 4.2.4.4 *Other unit interfaces*

This section describes the specific type and level of interface with other Coast Guard, Navy, NATO fleet units and craft for interoperability. It addresses the ability of the ship to provide services to and accept services from other systems, units or forces, and to use the services so exchanged to enable them to operate effectively together.

### 4.3 **SHIP FUNCTIONAL REQUIREMENTS**

While underway the ship shall be capable of performing the missions described in 3.1 for the scope and periods described herein. While in port the ship shall be capable of providing human support and maintenance capabilities as prescribed below with the assistance of off-ship facilities.

#### 4.3.1 MOBILITY

Describes the mission capabilities to be mobile.

##### 4.3.1.1 *Operational Mobility*

This section addresses the ship speed, service margin, endurance, seakeeping, and other high-level mobility factors. If defined in this section, seakeeping requirements should be defined as threshold values of Seakeeping Performance Index or Percent Time Operable (PTO). For each mission element, the requirement should be established against a specified set of operability

criteria, under a specified distribution of sea states, with a specified joint distribution of headings and ship speeds.

#### *4.3.1.2 Maneuverability*

This section should specify the ship maneuverability requirements based on the mobility and mission needs (e.g., tactical diameter, directional stability and controllability stopping, low speed heading and lateral control).

### **4.3.2 SHIP SERVICES**

This section provides a description of the degree to which the ship is self-sustaining and/or provide additional support beyond ship's own requirements. This section addresses the ship's requirements in the section headings listed below for electrical power, environmental control, auxiliary support systems, and stores capability.

#### *4.3.2.1 Electrical Power*

#### *4.3.2.2 Environmental Control*

#### *4.3.2.3 Auxiliary support Systems*

#### *4.3.2.4 Stores Capability*

### **4.3.3 OPERATIONAL READINESS**

This section addresses in the section headings listed below the functional and operational requirements that define operational readiness of the ship, its systems, and equipment to perform its assigned missions. The section presents requirements, which integrate the ship availability, maintenance, and manning concepts for the ship life cycle.

#### *4.3.3.1 Reliability, Maintainability & Availability*

This section addresses issues related to the probability of the ship being able to perform its intended function for the specified interval under expected conditions, the measure of the ship's ability to be retained in or restored to a specified condition when maintenance is performed, and the degree to which the ship will be in an operable state at the start of a mission. Specify any unusually high RM&A attributes if required to support the manning level established.

#### *4.3.3.2 Supportability and Maintenance Capabilities*

Provides requirements for self performed maintenance capabilities to support the ship and discusses the ship's overall maintenance philosophy with respect to shoreside assistance. This section addresses the requirements for the ship and its equipment to meet specified supportability (e.g., requirements for consumable items such as fuel, stores handling and storage and replenishment). It includes special requirements, if any, to support the established manning

level. This section addresses maintenance resources, accessibility to equipment, and equipment removal.

#### 4.3.3.3 *Manning*

This section addresses the manning complement of the ship and dedicated shoreside support. Identifies manning philosophy, goals, and constraints (operational, own unit support, corrective/preventive maintenance, facilities maintenance, etc.). It also includes a discussion of the requirements for systems intended to reduce manning, and lists minimum examples.

#### 4.3.3.4 *Safety*

This section addresses the safety considerations and safety plan developed specifically for the ship. It includes a discussion of the approach to system safety as it is to be applied to the design, with examples. It addresses lifesaving equipment.

#### 4.3.3.5 *Human Engineering*

This section addresses the planning and implementation of human engineering factors to be utilized in design and construction of the ship.

### 4.3.4 SURVIVABILITY AND VULNERABILITY

Provides survivability and vulnerability performance requirements (active and passive) for specific methods both mechanical and electronic.

#### 4.3.4.1 *Susceptibility and Observability*

This section addresses either the means for determining signatures (radiated noise, infrared, electromagnetic radiation, magnetic, radar cross section, wake, visual) and level of detectability required to meet mission threat environment requirements, or present the performance requirements and signature levels to be met.

#### 4.3.4.2 *Vulnerability*

This section addresses performance criteria required to oppose specific wartime environmental threats. This section provides expected levels of mission capability (e.g. full capability, reduced capability, or survive) when encountered with these threats.

- 4.3.4.2.1 Shock
- 4.3.4.2.2 Chemical, Biological and Radiological (CBR) Protection
- 4.3.4.2.3 Electromagnetic Pulse (EMP)
- 4.3.4.2.4 Fragmentation
- 4.3.4.2.5 Blast
- 4.3.4.2.6 Penetrators

#### *4.3.4.3 Recoverability*

This section describes the requirements and includes specific details for systems and spaces associated with damage control functions, organization and equipment required to combat fires, control flooding and dewater, control battle and casualty damage, and repair battle and casualty damage.

#### 4.3.4.4 *Physical Security*

### 4.3.5 SHIP CHARACTERISTICS

This section addresses in the section headings listed below the functional requirements of the topics.

#### *4.3.5.1 Hull form and Performance*

This section defines any constraints on the ship's principal dimensions.

#### *4.3.5.2 Structure*

This section defines the ship's structural requirements in terms of strength, reliability and stiffness.

#### *4.3.5.3 Stability*

This section provides design standards for stability.

#### *4.3.5.4 Materials*

This section presents material selection criteria that should reflect the required or proposed maintenance, reliability and life cycle considerations for the ship. In addition, special material requirements related to ship mission should be addressed. This section addresses material standards and restrictions for use in the construction of the ship and its equipment and outfitting.

#### 4.3.5.5 *Aviation Support*

This section describes aircraft support requirements including those contained in Air Capable Ship Aviation Facilities Bulletin No. 1.

#### 4.3.5.6 *Small boat Support*

In addition to describing ship support and interface features, this section describes the boats themselves with respect to size and carrying capacity.

### 4.3.6 COMBAT SYSTEMS

This section addresses the specific requirements for combat systems to enable the cutter to perform its missions.

### 4.3.7 COMMAND, CONTROL AND COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (C4ISR)

This section addresses C4ISR integration and provides requirements, capabilities, and description of features.

#### 4.3.7.1 *Command and Control*

This section addresses ship, machinery, and damage control control systems.

#### 4.3.7.2 *Navigation*

#### 4.3.7.3 *Exterior Communications*

#### 4.3.7.4 *Interior Communication/data Distribution*

#### 4.3.7.5 *Intelligence, Surveillance, and Reconnaissance*

### 4.3.8 SHIP DESIGN FEATURES

*This section addresses goals related to operation and growth of the ship over the life cycle of the ship.*

#### 4.3.8.1 *Modularity*

#### 4.3.8.2 *Preplanned Product Improvement*

#### 4.3.8.3 *Margins*

This section addresses growth allowances during the anticipated life of the asset.

- 4.3.8.3.1 Mass Properties
- 4.3.8.3.2 Stability
- 4.3.8.3.3 Structure
- 4.3.8.3.4 Electric Power
- 4.3.8.3.5 Area/volume
- 4.3.8.3.6 Habitability
- 4.3.8.3.7 Auxiliary Support Systems
- 4.3.8.3.8 Internal/External Communications

#### 4.3.9 STATUTORY REQUIREMENTS

This section addresses in the section headings listed below statutory requirements to be met by the ship.

##### *4.3.9.1 Environmental Impact Requirements*

- 4.3.9.1.1 Sewage and Liquid Waste
- 4.3.9.1.2 Oil pollution
- 4.3.9.1.3 Solid Waste
- 4.3.9.1.4 Airborne Emissions
- 4.3.9.1.5 Hazardous Materials
- 4.3.9.1.6 Noise

#### 4.3.10 REGULATORY REQUIREMENTS

This section addresses standards and regulatory requirements not previously addressed. These may include but are not limited to, USCG, SOLAS, IMO, EPA, OSHA, USPHS, etc.

##### *4.3.10.1 Classification & Certification*

This section addresses classification and certification of the ship by various regulatory bodies such as ABS, BUMED, NAVAIR, USPHS, USCG, etc.

#### 4.3.11 ARRANGEMENTS

This section addresses requirements, which drive the ship configuration.



#### 4.3.11.1 *Area and Volume Allocation*

#### 4.3.11.2 *Access and Egress*

##### 4.3.11.2.1 Adjacency and Separation

##### 4.3.11.2.2 Mission Spaces

### 4.4 ***HUMAN SUPPORT SYSTEM***

This section describes human support system services to satisfy personnel anthropometrical, physiological, psychological and sociological needs, including the onboard and shore support interfaces. Critical design requirements and the quality of features should be included.

#### 4.4.1 BERTHING

#### 4.4.2 SANITARY FACILITIES

#### 4.4.3 LEISURE AND COMMUNITY FACILITIES

#### 4.4.4 FOOD SERVICE FACILITIES

#### 4.4.5 MEDICAL FACILITIES

#### 4.4.6 SERVICE FACILITIES

#### 4.4.7 LAUNDRY FACILITIES

#### 4.4.8 ADMINISTRATIVE FACILITIES

#### 4.4.9 STOWAGE FACILITIES

#### 4.4.10 WORKSHOPS

#### 4.4.11 TRAINING FACILITIES

#### 4.4.12 POTABLE WATER FACILITIES

## 5 **VERIFICATION**

### 5.1 ***REQUIREMENTS***

This section specifies the requirements associated with validation of compliance with specified performance requirements. The section shall be structured as a mirror image of section 3 and include all inspections to be performed to determine that the item to be offered for acceptance

conforms to the requirements in section 3 of the specification. This section should not include quality requirements that are in the contract, such as responsibility for inspection, establishment of quality or inspection program requirements, warranties, instructions for nonconforming items, and contractor liability for nonconformance. Specific reference to the Asset Test & Evaluation Program Plan and CSCM certification should be made so it is clear how the verification processes associated with these three documents are coordinated.

**5.2     *DESIGN INTEGRATION TESTING***

**5.3     *TEST AND EVALUATION REQUIREMENTS***

**5.4     *POST DELIVERY DEMONSTRATION AND TRIALS***

**6     NOTES**

**6.1     *DEFINITIONS AND ACRONYMS***